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ART. I.—*Researches on Typhus Fever, based on Observations made during the Winter and Spring Months of* 1864. By J. M. DA COSTA, M. D., one of the Physicians to the Pennsylvania Hospital.

THE occurrence in several of our cities, during the last year, of a fever of a low type, dissimilar to the enteric fever which we are mainly accustomed to meet with—in other words, the existence in our midst of a fever with the characters of true typhus—is a matter which has not escaped the attention of the profession. Indeed, there are many indications that the same typhus wave which has swept so ruthlessly over several of the countries of Europe has reached our shores, and has left on them its distinct impress. Typhus fever, as is well known, is not a disease that can be said to be indigenous to the United States; and though at different times it has prevailed extensively, and though at all times cases of it are likely to be found in our seaboard towns, yet its presence in an epidemic form is not so frequent as to preclude the necessity of studying and portraying the traits it may display. In this paper, based on the examination of many cases of the disorder that have passed under my observation, I shall endeavour to give a sketch of the fever which has prevailed in Philadelphia for at least one year, and which, I think, exhibited some peculiarities which it may prove useful to record. Indeed, in the following remarks, I shall dwell on these peculiarities rather than attempt a general description of typhus fever, contrasting, as I proceed, the phenomena observed with those which the history of many epidemics has made us regard as the standard expression and history of the disease. To avoid reiteration, I may here state that the materials from which my description is drawn were collected partly in private practice, partly at the Philadelphia Hospital, but chiefly in the wards of the Pennsylvania Hospital, and that I have been much

aided in gathering them together by the intelligent zeal of the Resident Physicians, Drs. Andrews and William Pepper.

The affection may begin with a chill, followed by fever which continues without remission. But in many cases pain in the back and limbs, loss of appetite, and looseness of bowels precede the febrile phenomena; symptoms which last, indeed, after the fever has fairly set in, and are in some instances associated with epistaxis. The fever is attended with a dry tongue, a flushed face, a watery eye, prostration, some dulness of hearing, and mental hebetude, but, in its earlier stages at least, very rarely with delirium. Between the fourth and seventh days an eruption appears on the skin, scattered over the abdomen, chest, and thighs, more rarely over the arms; at first much modified by pressure, but soon little influenced by it, and remaining until the decline of the malady. As the disease reaches the second week, all the symptoms of low fever become strongly marked; the teeth and lips are covered with sordes; the tongue is tremulous; the prostration and delirium or other signs of nervous derangement are more evident. The patient is often deaf; his skin cooler than during the first manifestation of the affection; the pulse ranges from about 100 to 130; the bowels in many instances retain their irritability. The subsequent progress of the case, from the end of the second week, depends greatly upon the violence of the disorder, and the termination to which it inclines: if unfavourable, depression and stupor increase, involuntary passages happen, and the patient dies exhausted; if favourable, a gradual brightening of the face, a moist tongue, and a slower pulse foretell the fortunate issue.

Such is an outline of the symptoms of the complaint as commonly seen. From even this brief description the reader will be struck with the fact of the occurrence of symptoms, such as epistaxis and diarrhœa, which are more usual in the enteric form of continued fever. But we shall best be able to appreciate in how far they belong to the disease by subjecting its principal features to a more detailed analysis, and, at the same time, its complications, of which as yet no cognizance has been taken, may be noticed.

Mode of Invasion.—In some instances the access of the disorder is sudden, even violent. This happened in two cases. In one there was severe chill, soon succeeded by wild delirium and coma; in another, a nurse, while bending over the fever patient, was seized with faintness and nausea, which were followed by a very grave attack of the malady. But these are exceptional cases. In by far the largest number the disease does not begin suddenly, nor is it ushered in by a chill. Thus of 23 cases besides those referred to, in which particulars of the onset of the affection could be obtained, a chill is only noted to have occurred in 6; in two of which it is described as a chilly sensation rather than a marked rigor, and one of which was a fatal, another a protracted case. The other early symptoms were headache, giddiness, pain in the back and limbs, loss of

appetite, nausea, vomiting, sleeplessness, diarrhœa, epistaxis, cough, and palpitation. Of these, the pain in the back and lower extremities was the most constant; indeed, there was scarcely an instance in which it was found to be absent. Next in order was headache, sometimes frontal, but sometimes in the back of the head. Nausea and vomiting are mentioned in 8; nausea without vomiting in 1; a catarrhal cough with mucous expectoration in 4; severe palpitation, associated with epigastric pain, in 1 of the 23 cases. The symptoms referred to mark the commencement of the disease, and are soon combined with fever and quickened pulse; but, associated with lassitude and dejection of spirits, one or several of them may happen as premonitory signs. In several of the cases the prodromes were of a week's duration; but, as a rule, they did not precede the febrile attack for more than three or four days.

Symptoms.—In analyzing these, we shall begin with the *physiognomy*. The face of the patient is characteristic. The expression is dull, and shows no signs of suffering. Very generally the face is flushed—not deeply, but uniformly. In no instance was it of livid hue, and, as a rule, its colour was not so deep as it usually is in marked cases of typhus fever. The eye is always suffused, the conjunctiva commonly more or less injected, the pupil small. The appearance of the eye is so striking that it is in itself almost a certain sign of the disease, and, when joined to the hue and expression of countenance, forms a physiognomy which stamps the affection. Nor do these traits manifest themselves late in the disorder. Frequently, indeed, patients were admitted to the hospital in whom the malady had not reached its sixth day, but whose features bore already the unmistakable impress of the fever. Nay, many a patient applying at the gates, for the relief of unaccountable lassitude and debility, exhibited a countenance which at once proclaimed their real cause. The flush on the face, and peculiar eye, continue during the fever. The former gradually disappears as decided convalescence approaches; so does the suffusion of the eye. The injection of the conjunctiva vanishes, as a rule, before the flush on the cheeks; but in some of the cases it is noted to have been protracted into convalescence.

The *skin* is, as a rule, dry and of elevated temperature, which towards night is increased. But very few cases present that burning, pungent heat which is so much dwelt upon as belonging to the disease. Thus in 16 cases which progressed without complications to a favourable termination, only one, a boy, exhibited the "calor mordicans." Of the others the record says: in 1 considerable heat and dryness of skin; in 4 cases skin hot and dry, in one of which it remained so only a few days, and then is noted as pleasantly warm and supple on the extremities, and hot on the abdomen; in 1 hot but moist; in 7 the expression warm, or moderately warm, or somewhat heated, is used; in 1 the skin was hot and moist, and profuse sweats took place during convalescence; in 1 hot, and its dryness or

moisture is not mentioned. The increased temperature does not continue without abatement throughout the whole course of the malady. About the middle of the second week it falls, and the skin begins to lose its dryness. During convalescence it is cool, and desquamation is not unusual. A peculiar and offensive odour is only noted to have occurred in a few instances. In those cases in which complications happened, burning heat of skin is mentioned in a larger proportion. But as several of these complications were visceral, especially pulmonary inflammations, the very great heat of surface is as likely to have been determined by them as by the typhus fever.

The *pulse* is feeble and devoid of hardness. Occasionally it is found to be of good force, though small, even at the height of the disease; yet this is very exceptional. At the onset of the fever it may be strong and full, but it soon loses its strength and volume, and becomes very compressible. A bounding, tense pulse was not noticed in a single instance, no matter what the complication. The cases in which the force or volume of the pulse remained good, all recovered. As regards the frequency of the pulse, it was generally above 100. In twenty-one cases of average severity, not having any special complications, and ending favourably, it reached above 100 in all save three. In nine it was 120; in five between 120 and 130; in two between 130 and 136; in three between 92 and 100; in one 100; in one 88. In this case the pulse, before the fever left, sank to 64, but though so slow, the attending symptoms were those of considerable prostration, and the case was not a light one. The most frequent pulse recorded in the cases not terminating in death was 166. It was accompanied by violent delirium, and by such intense restlessness, that the patient had to be strapped in bed. In all the fatal instances the pulse was above 130; in one it was 156, in another 144. In cases complicated with pneumonia, it reached the latter figure. Great frequency of pulse is, therefore, a bad sign. It indicates either a very severe form of the disorder, or a visceral complication.

The evening pulse is apt to be a few beats more than the morning pulse; but in no case noted did the rise exceed twelve. A decided fall in the pulse is, as a rule, a sign of approaching convalescence. Whilst the malady is at its height, the pulse does not exhibit any marked variations, but as soon as the fever begins to decline, the pulse becomes slower, and often somewhat fuller. This steadiness of the pulse for days is very striking. In a number of instances in which it was carefully observed at about the same hour daily, it scarcely varied by a beat from day to day; its fall was the precursor of a favourable issue, and indeed became an indication of it before any other symptoms pointed distinctly in that direction.

In connection with the pulse, the state of the heart may be mentioned. The weakening of the first sound, and of the impulse, are phenomena as commonly witnessed in this as in other epidemics.

The *eruption* is very constant and significant. It is so constant that I

met with it in every well-marked instance of the disease. It was only absent in a few very light cases, the nature of which, moreover, was doubtful. It is not petechial, true petechiæ having been observed only twice in about fifty cases. Its characters may be thus summed up: A reddish eruption scattered all over the body, excepting on the neck and face, most evident on the chest and abdomen, where, indeed, it begins. The spots, when they first appear, are not so dark as those of measles, of lighter hue, indeed, and less coarse than I have often seen them in typhus fever on former occasions. They are of very unequal size; some are quite large, others not much larger than the rose rash of typhoid fever. The larger spots at first disappear, or almost entirely disappear upon pressure, and the change of colour takes place from the circumference to the centre. The smaller spots are less influenced by pressure. Indeed, the larger spots become the smaller, hence the latter are a later development of the eruption than the former. Neither is decidedly elevated, nay, though a slight rise above the skin may be made out, it is difficult to establish, and its occurrence is not free from doubt. After the eruption has lasted a day or two no elevation can be detected; the rash is darker, though still reddish, and far less influenced by pressure. It disappears in part only, and thus it may remain until it fades; or it becomes more fixed, and does not change on pressure. But instances are not unusual in which the spots are very much affected by pressure throughout the whole malady.

A redness of the skin, less defined than the spots described, and lying between them and of a much paler hue, is often met with to a greater or less extent; examples, too, of sudamina are not wanting. The spots are generally very distinct, and may even be recognized in mulattoes. They appear on or about the fifth day, do not come out in crops, and pass away with commencing convalescence, though they may still be sometimes recognized while all the other signs are already betokening rapidly returning health. Of 7 cases admitted into the hospital on the fifth day of the fever with distinct eruption, it had all but faded in 2 on the twelfth day; in 1 only a few traces were to be seen on the fourteenth day; while in 1 it could still be detected, though it was very faint, up to the nineteenth day of the malady, and at least five days after fairly established convalescence. In one case, first examined on the seventh day of the disease, the spots were scarcely visible on the thirteenth; in another, the eruption appeared on the fourth day, was almost gone on the tenth, but could still be traced up to the sixteenth day.

From an early period of the complaint the *tongue* becomes altered, and keeps its unhealthy look to the end of the fever. Early in the affection and at its height the tongue is almost uniformly observed to be coated, though not heavily so, and is usually dry. The coat may extend over the whole organ, but it is not uncommon to find it only on the middle or in streaks, the tip and edges being red. An analysis of 25 cases ending in recovery

gives this result: Tongue dry and coated, 7; dry, glazed, and fissured, 1; dry, fissured, and heavily coated, 1; coated and moist, 6; whitish or yellowish coat, red edges and tip, 10. In those embraced under the last head the tongue was mostly dry, and the coating was only heavy at, or was confined to the centre, or existed in light streaks. A blackish crust was noticed in several of the graver cases. In one of these the organ was first smooth and coated and then dry and dark. Moisture and cleansing of the tongue were favourable symptoms preceding convalescence; so was it favourable when the tongue from being dry and coated in patches, became moist and more generally coated. A tremulous state of the tongue is mentioned in a number of the notes of the severer cases just analyzed. In 4 fatal cases the tongue from having been moist became dry and glazed in 1; in 1 it became dry and was with difficulty protruded; in 1 it was at the beginning dry in the centre and coated, but was moist and very tremulous towards the end; in 1 it was moist at the tip and brown and dry at the centre, and tremulous; and in both of the last two cases the tremor was associated with obvious trembling of the lower jaw.

The *loss of appetite* and the *thirst* present nothing peculiar. They occur as in most continued fevers. *Nausea and vomiting* were noted in about one-fourth of the cases. In all they were early symptoms, happening either at the very onset of the disease or in its first days.

As regards the *intestinal symptoms*, it was observed that in 31 cases the bowels were regular, open not less than once in twenty-four hours in 4; sluggish, inclined to costiveness in 5; constipated in 9; decidedly loose in 13. One of the cases included in the second category had at first slight diarrhœa. On the other hand, in two included in the last, the bowels became regular, and in two others costive, before the fever left. In one they were at first bound and then became relaxed; but generally the looseness commenced early in the malady and continued more or less decidedly until convalescence. Those classed as constipated were for the most part such persons in whom it became necessary to resort to injections or laxatives to procure a passage. The diarrhœa, as a rule, occurred in the severer cases. The number of passages varied from four to twelve in the twenty-four hours. They were thin, and small, feculent stools, often offensive, and of yellowish colour. In one instance they are spoken of as having been attended with griping pains.

This is certainly a curious and exceptional state of things. Diarrhœa, so common in typhoid fever, is generally reported to be very rarely met with in typhus. In only 15 cases of 144, says Dr. Murchison in his elaborate work on Continued Fevers, was there any approach to diarrhœa. Here we find 13 out of 31 presenting this symptom in a marked degree: and as this condition formed so often a prominent feature of the epidemic malady under discussion it may not be amiss to record some illustrative cases.

CASE I. *Typhus fever with diarrhœa; four to six passages daily;*

epistaxis; recovery.—Mary H., æt. 14, admitted April 11, 1865, into the Pennsylvania Hospital, bed No. 36, from a district of the city where typhus prevails. Was seized about April 5th with chill, followed by fever, pains in abdomen, vomiting and purging, anorexia, headache and backache. Day before admission had free epistaxis, and the diarrhœa has continued until present time, about six stools daily. Eruption not profuse; generally diffused, though mostly on abdomen; not altered by pressure.

April 12. Pulse 120, feeble. Tongue very dry and lightly coated in centre; eyes suffused and somewhat injected; pupils of good size; considerable heat of skin; bowels opened four or five times; no vomiting; belly meteoric. She is very drowsy, moans, and once or twice has been delirious, getting out of bed; but her answers are perfectly correct and her memory good; voice strong and tone natural. Ordered acid. nitromuriatic. gtt. iv every fourth hour. Whiskey ℥vj daily. Beef-tea.

13*th.* Bowels four times opened; thin, feculent stools; tongue rather less dry; eyes somewhat heavy and injected, but her expression is good and her mind quite active; some dulness of hearing; retains urine a long time; vomited a little yesterday morning; belly slightly meteoric; no ileo-cæcal gurgling or pain; pulse 120, rather feeble; skin hot and dry; sordes on teeth; eruption as before. Increase whiskey to ℥viij.

14*th.* Bowels open five or six times during past twenty-four hours; lies on back during sleep with mouth wide open, eyes not entirely closed; sordes on teeth; head drawn back; pulse 120, small but of better force; pupils normal; considerable thirst; slight cough; eruption as before.

15*th.* Brighter; tongue dryish in centre; bowels opened this morning; pulse 108, gaining force.

17*th.* Expression of countenance very much brighter; tongue soft and slight coat in centre; pulse 84, of good force and volume; bowels opened once in twenty-four hours, stool of moderate consistence, and light coloured; eruption almost disappeared, spots have a brownish hue; stop acid; give four grains of quinia daily.

19*th.* Slightly deaf still; tongue clean and moist; eye bright and intelligence very good; pulse 80; eruption almost gone; bowels regular; appetite good; sleeps well.

20*th.* Rapidly convalescing; bowels regular.

24*th.* Leaves hospital cured; pulse about 80; no cardiac murmurs, though heart's action still much increased by movement or any gastric disturbance; voracious appetite and gaining flesh.

Sometimes, as previously stated, the bowels are at first constipated, but diarrhœa then sets in, and a looseness of bowels remains until convalescence.

CASE II. *Typhus fever with diarrhœa succeeding to constipation; epistaxis; recovery.*—W. P., æt. 28, admitted into the hospital April 4, 1865. Born in Millville, New Jersey; has followed the sea since twelve years of age; last voyage from Wilmington, N. C.; was ashore a good deal at Wilmington. Had occasional nausea, and pain in limbs and head, on voyage up. Was taken ill on March 31st with an imperfect chill, followed by high fever, pain in head, back, and limbs; some pain in abdomen; bowels costive; no epistaxis.

Upon admission, pulse 130, feeble; skin hot and dry; tongue dry and coated; eyes congested; countenance dull; appearance of profound languor; coarse eruption on trunk and extremities. To take acid. nitromuriatic. gtt.

vj every third hour. Beef-tea and milk-punch ℥ij of each every second hour.

April 5. Pulse 124; respiration, 30; eyes still congested; tongue coated and dry in centre, moist along edges; bowels opened twice; epistaxis from both nostrils; hebetude, yet mind seems clear; no appreciable deafness.

6*th*. Slept badly; bowels opened three or four times; stools thin; no more epistaxis; hebetude and drowsiness; eyes still congested; tongue dry, slightly coated in centre; pulse 124, small and feeble; eruption scarce, same as before; mind clear when roused, but expresses wish to die; belly meteoric, neither gurgling nor pain; urine sp. gr. 1022, slightly acid, no albumen, chlorides almost absent.

7*th*. Skin cool; pulse 124, very feeble and small; tongue dry. Whiskey f℥xviij daily; beef-tea continued; whiskey given partly in milk.

8*th*. Intelligence same; bowels opened several times; passes water freely; pulse very small and feeble; eruption still visible; abdomen meteoric; urine sp. gr. 1022, slightly acid, chlorides very deficient, no albumen; urates in casts. Whiskey f℥xxiv.

9*th*. Drowsy, but more easily roused; pulse 111, gaining strength; tongue less dry; hearing better; eyes still suffused and congested, with small pupils; passes urine; bowels opened quite frequently; no subsultus; no tinnitus. Tr. opii gtt. xxx by injection.

10*th*. Drowsy; bowels opened about three times during night; skin pleasantly warm on extremities, hot on abdomen; pulse 102, much stronger; belly meteoric; eruption very scarce, but still visible; passes his urine voluntarily; no cough; eyes less injected; tongue dry; flapping of veins of neck.

11*th*. Heavy, disposed to sleep; tongue less coated, dry and smooth at tip; moist at edges; eyes injected, pupils small; skin moderately warm; pulse 100, of good volume and increasing strength; belly tympanitic; bowels quiet; eruption visible; urine sp. gr. 1020, acid, chlorides increasing, no albumen, urates. Face has a bloated appearance. Reduce whiskey to f℥xviij.

12*th*. Less heavy; hearing good; eyes less injected; no cough; belly slightly meteoric; pulse 88, good volume and force; tongue cleansing and moist at edges.

13*th*. Less heavy; eyes still slightly injected; skin warm; tongue only dryish, and clean; bowels opened three times last night; pulse 80, compressible; eruption still visible; pulse 66 at 11 o'clock, of fair volume; urine of sp. gr. 1011, acid, abundant chlorides, no albumen; no abnormal deposit.

14*th*. Eyes clearer; complains of feeling dull; tongue dry and glazed in centre; bowels opened four times since yesterday, the stools becoming consistent; sleeps a great deal, but when aroused, mind is active; belly of normal shape; skin pleasantly warm; pulse 81, small and compressible; only a trace of eruption. Acid twice daily, and quinia gr. vj daily. Reduce whiskey to f℥xv.

15*th*. Pulse 78, compressible; tongue dryish; skin supple and moderately warm; intelligence good when he is aroused, answers being correct, but he is very drowsy; belly normal.

16*th*. Bowels opened three times; pulse 66, of good volume and force; tongue moister, with patches of soft coat; intelligence good; eyes clear; eruption scarcely visible.

17*th*. Intelligence good; tongue clean and soft; belly rather flat, with

a few traces of eruption; pulse 75; bowels opened two or three times; good appetite, not much thirst.

21*st*. Sitting up; rapidly gaining in every respect.

In the following case the diarrhœa formed an even more prominent feature of the malady, and persisted also throughout the attack:—

CASE III. *Typhus fever with diarrhœa from onset of disease; bowels remained loose during its whole course; epistaxis; recovery.* —J. S., æt. 21, admitted into the Pennsylvania Hospital April 28, 1865; born in Philadelphia; a sailor—last trip from Delaware Bay. Felt prodromes of this attack about eight days ago; pain in head and back; flushes of heat; anorexia; epistaxis. Since Tuesday last he has been confined to bed; the epistaxis was repeated, bowels opened five or six times daily, with occasional griping pain in stomach, also prostration, and considerable sweating.

On admission, skin was moderately warm, inclining to moisture; tongue coated, but moist; pulse of fair force though small; belly meteoric with distinct eruption; eye slightly congested, pupil rather small; cheeks flushed. Acid. nitromuriat. gtt. vj every four hours; two oz. of beef-tea and milk-punch every two hours. During night, as bowels were frequently opened, gtt. xxxv tr. opii by enema were given, and after that he slept quietly.

April 29. Face flushed; intelligence very good; quite loquacious; eye very slightly injected, pupil normal; tongue heavily coated, yet is moist; considerable cough, white mucous sputa; skin warm—moisture on forehead; pulse 96, of fair volume, but compressible; belly slightly meteoric; no pain or gurgling; eruption scattered all over body, most marked over hypochondria; slightly elevated and much modified by pressure. Urine sp. gr. 1005, chlorides almost absent, no albumen, very pale, slightly acid. Respiration harsh, with coarse, dry, and moist râles postero-inferiorly.

30*th*. Coughs considerably with white mucous sputa; face very much flushed; capillary circulation rather stagnant; eye clear; pupil normal; skin cool; tongue coated, inclining to be dry; some epistaxis yesterday afternoon; bowels opened ten times since yesterday morning—thin, yellowish stools; pulse 80—compressible. Eruption quite copious, coarse, much darker than tâches rouges. Many of the spots almost disappear under pressure, but some of them are quite persistent. Whiskey increased to f℥xij. Tr. opii gtt. xxx by enema; stop acid., give quinæ gr. xij daily.

May 1. After injection yesterday bowels were not opened until night, during which, however, he had about three very large thin stools. This morning pulse 96, rather small and feeble; intelligence very good; hearing fair; some tinnitus aurium; eyes clear, pupils normal; respiration attended with coarse, dry, and a few moist râles, and harsh murmur over postero-inferior part of both lungs; belly becoming scaphoid; eruption very distinct; spots dark, and very many of them do not disappear under pressure; urine sp. gr. 1014, chlorides almost absent, no albumen, slightly pale, almost neutral, no deposit; tongue moist, slightly coated; lips cracked. Tinct. opii camph. f℥j with aq. camphor. f℥ij, to be taken when bowels are loose.

The subsequent progress of the case was marked by a gradual decline of the diarrhœa, which, if not arrested, was kept in check by the paregoric. On the 5th of May, the patient was rapidly gaining strength. The eruption was much faded; the bowels had been opened four times in twenty-four hours. After that the bowels, though slowly becoming more regular,

remained loose during his entire convalescence, which, on the whole, progressed favorably. Soon after the 12th of the month he left the hospital.

While engaged in analyzing the frequency and character of the stools, some other abdominal symptoms, such as meteorism, pain, and gurgling, may be inquired into. *Meteorism* was observed in fully one-third of the cases. In 30 cases its existence is noted in 11, in the remainder the state of the abdomen is indicated as normal, as supple, or is not specially mentioned. Though in all the cases in which the symptom is spoken of it was well-marked, and the abdomen unnaturally full, in no case did the tympanitic distension reach extreme limits. *Gurgling* was not encountered in a single instance, at all events, there is not a single record of its occurrence, and in very many of the notes its non-occurrence is distinctly stated. *Abdominal pain* and tenderness were rare symptoms, and when met with, the tenderness was never great nor limited to any particular spot. In one case its seat was chiefly epigastric.

Cough is very commonly present. It existed in fifteen of twenty-eight cases, not counting those in which it was associated with pneumonia. It is generally connected with bronchitis, and is found to coexist with coarse, dry, or moist râles; and with a slight though tenacious mucous expectoration. In several instances the catarrhal condition of the bronchial tubes preceded the fever. The cough is rarely very frequent, nor is it a source of annoyance. It may be conjoined to more or less hypostatic congestion of the pulmonary tissue, and then the percussion resonance is decidedly impaired. But hypostatic congestion was also noticed when no cough or expectoration happened, and did not reveal itself except by the physical signs—the altered percussion note, the harsher, more bronchial breathing, or the persistent crepitating râles.

The *respiratory movements* are usually somewhat accelerated. At the height of the febrile malady they are apt to range from twenty-four to thirty-two, even in cases in which there are no chest symptoms. In one patient, however, they never rose above twenty-two, though his pulse beat from 108 to 120. The breathing is, as a rule, regular, and, indeed, normal in all save its frequency, unless there be a pulmonary complication. In some cases the rapid respiration forms a prominent feature, and may even be attended with a comparatively slow pulse. This happened in a man twenty-seven years of age (Richard P., Bed 28), who had much subsultus, delirium, and tube-casts in the urine, whose pulse was of fair volume and force, and ranged from 88 down to 64, though the respirations were forty in the minute.

In this curious case, which ended in recovery, the frequent respirations were not due to any discoverable morbid condition of the lungs. Nor were they in the following, in which the pulse bore a more normal proportion to the respiratory movements:—

CASE IV. *Typhus fever; shallow respirations, forty in the minute;*

great prostration and muscular tremour; recovery.—P. B., æt. 30, a labouring man, admitted into the Pennsylvania Hospital, April 24th, 1865, lives at 21st and Shippen Sts. Felt symptoms of attack seven or eight days ago, viz., violent pain, especially in back of head and small of back; cough, with tough mucous sputa; vomiting and looseness of bowels; has become rapidly prostrated.

April 25. Considerable hebetude and some deafness, though answers are correct when his attention is fixed; face uniformly flushed; eyes suffused, with small pupils; tongue dryish and coated; sordes on teeth and lips; considerable muscular tremour, with slight subsultus; bowels opened freely two or three times; urine free, sp. gr. 1019, acid, chlorides almost absent, no albumen, amber colour, deposit of rosette phosphates, granular urates, few fragments of tube-casts; skin hot, with a copious coarse rash over whole surface, except face, but most marked on thorax and abdomen, the large spots somewhat modified by pressure, the small ones scarcely at all; pulse small, compressible. Ordered milk-punch and beef-tea every second hour; acid. nitromuriatic. gtt. vj every fourth hour. In the afternoon, as the pulse had increased in frequency, the amount of whiskey was increased to f℥j every hour, and toward midnight, the pulse being still more compressible and feeble, and 120 in minute, and the tongue very dry and tremulous, the amount was further increased to f℥iss every hour, and the acid given every three hours.

26*th.* Expression somewhat better, though still dull and heavy; eyes suffused, pupils small; yet intelligence is perfect, though slow; occasional cough; respirations very shallow, 40 in minute; a few moist râles at posterior lower part of lungs; skin hot, and inclining to moisture; pulse 108, very compressible; tongue dry, brownish, and fissured, though not deeply, and tremulous; no muscular tremour or picking of the bedclothes; some sordes on teeth; bowels opened twice; eruption very abundant, and some mottling of trunk; decided odour; cardiac impulse feeble; first sound very feeble; urine sp. gr. 1013, acid, chlorides very deficient, slight amount of albumen, amber colour, urates, and tube-casts.

27*th.* Expression heavy, dull, and fixed; very slight deafness; eyes much congested; pupils small; face flushed and hot, inclining to moisture on forehead; tongue well-shaped and moist at edges, but thickly coated and very dry and fissured in centre; some sordes on teeth; no muscular tremour, and tongue less tremulous; cough very rare; respiration still very frequent and shallow; belly meteoric; no pain nor gurgling; bowels opened twice during night; urine sp. gr. 1011, rather more chlorides, opalescent by heat and nitric acid, pale colour; eruption as before; mottling of trunk less distinct.

28*th.* Much improved; intelligence quicker; hearing better; pulse 95, gaining force; heart sounds more forcible; skin cool and soft; belly large, tympanitic; bowels opened twice; urine very free; respirations about 32, fuller; eye much clearer, pupils still small; tongue less tremulous, becoming moist; eruption as before, large spots still very much modified by pressure, but spots are smaller than before, and mottling of trunk less distinct; nose bled a few drops; urine 2210 cubic centimetres, sp. gr. 1014, alkaline at end of twenty-four hours, very deficient in chlorides, no albumen, deposited heavily phosphates, radiating urates, some epithelium, and a few small tube-casts.

29*th.* Pulse 92, and gaining strength; expression better; face has nearly lost its flush; eye less injected; tongue still heavily coated and slightly

tremulous; belly large, supple; bowels opened twice; skin moderately warm; eruption fading; slight cough; some sordes on lips and teeth; spots much smaller and less distinct, small ones do not disappear under pressure, large ones disappear under forcible pressure, and both are influenced by pressure, though eruption has already passed its height. Whiskey reduced to f℥xv daily.

30*th.* Expression much better; less flush of face; tongue less coated, very tremulous; skin warm, supple, moist on trunk; pulse 72, of good force and volume; bowels twice opened; eruption very much faded; whiskey reduced to f℥xij; urine (April 30th to May 1st), total quantity 1100 cubic centimetres, depositing urates and phosphates, sp. gr. 1022, chlorides increasing, no albumen, light amber.

May 1*st.* Drowsy; eye clear; face looks somewhat emaciated, as the flush has disappeared from cheeks; considerable cough, but slight expectoration, and no marked râles; tongue moist, tremulous; belly large; eruption nearly gone; pulse 83, of fair force; eruption on back but little modified by pressure; bowels twice opened.

2*d.* Pulse 80, gaining force; tongue moist and clean, and but slightly tremulous; eruption losing its distinctness; eye clear; mind rapidly becoming more active; but little cough.

In the case just detailed the respirations were more specially deranged in frequency. But they may be at the same time noisy, without there being any signs of a pulmonary lesion, none certainly save congestion, and that not sufficient to account for the hurried and very much altered breathing.

CASE V. *Typhus fever; great prostration; respiration* 50 *and noisy; death.*—Matilda W., native of Ireland, æt. 28, admitted into the Pennsylvania Hospital, Feb. 11, 1865, had been sick about four days. On admission the symptoms were as follows: Tongue slightly coated in streaks; moderate heat of skin; pulse 94; coarse spots influenced by pressure, though not quite disappearing on pressure, found plentifully dispersed on chest, and abdomen, and extremities; headache, but mind seems perfectly clear; bowels somewhat loose; no pain on pressure in iliac fossæ; two passages this morning.

Feb. 12*th.* Pulse 100; about the same in other respects. Acid. nitro-muriatic. gtt. iv every four hours; to be sponged twice daily with vinegar and water, and cold water applied to head.

13*th.* Pulse 104; face flushed this morning; tongue still red, perhaps redder than it was, and still yellow streaks on each side of centre; two watery stools last night. In the evening pulse 116.

14*th.* Pulse 108 to 112, very compressible; eruption still plainly visible; mind clear; throat and tongue dry, of brownish colour. Ordered ol. terebinth. gtt. x every four hours; 1 oz. beef-tea every three hours. P. M., pulse 124; very restless; constant desire to get out of bed; mind duller; turpentine to be given in ℥ss of camphor water; ℥ss whiskey every second hour.

15*th.* Pulse 116; tongue dry; still some headache, but mind clearer than last night; continue turpentine, and whiskey in milk, also beef-tea every two hours. 7 P. M., pulse 132; skin very hot; necessary to use bandages to keep her in bed; bowels open to day; passes her urine well.

16*th.* Pulse 116 to 120, has more volume; tongue still dry, but moister than yesterday; mind clearer; seems to answer with more readiness; eruption still distinctly visible: mutters to herself in low tones: not much heat

of skin; bowels open to day. Ordered f℥ss whiskey every hour till evening, then ℥j every second hour; continue beef-tea, milk, and medicines, except acid. Afternoon the tongue was again very dry, and protruded with difficulty; and the pulse feebler.

17*th*. Did not sleep during the night; took her food and whiskey regularly, and without trouble; pulse 124, feeble; tongue protruded with difficulty; appears to be rational in some answers, but is very feeble and constantly muttering; counter-irritation in the shape of sinapisms continued to back of neck; whiskey every hour till evening. At 6 P. M. pulse 124, remains of very feeble volume; respiration 50, noisy; no dulness on percussion anteriorly; no marked auscultatory signs anywhere, except a few coarse râles on left side; bowels moved three times this evening; heart sounds decidedly feeble; so is impulse; whiskey has not increased pulse since noon; continued 1 oz. whiskey every hour, also the turpentine and turpentine stupes to back of chest. At midnight pulse very feeble, 140; whiskey somewhat diminished, six drachms every hour, but ten drops of chloroform every two hours; the turpentine was stopped for the night; nourishment given as freely as possible.

18*th*. 1½ A. M. pulse very rapid and feeble; feet, legs, and arms were cold; warm water to feet; mustard plasters to legs, and teaspoonful of ether internally. 8 A. M. pulse still feeble, if any change fuller. Urine of acid reaction, containing a small quantity of albumen, normal amount of chloride, great excess of urates; phosphates, if at all changed, are diminished; tube-casts somewhat granular and coated with epithelial cells. Took 1 oz. whiskey at 10 A. M.; pulse 148, still feeble; body covered with moisture; breathing still very rapid and shallow; some impairment of resonance at back of right lung, with a few coarse râles; no bronchial breathing; mind, if anything, duller; face flushed; whiskey continued ℥ij every two hours, with 4 grs. quinia every two hours, and also a mixture of chloroform and alcohol. In the afternoon pulse 152 to 156; no change in breathing, still very frequent and noisy, is perhaps fuller than in morning; the same slight impairment of resonance over back of right lung, with a few coarse râles; no bronchial breathing; mind duller; face flushed, covered with sweat. In the night breathing somewhat more difficult, still very feeble; is gradually growing worse; pulse still about 152; whiskey was diminished to see if the pulse would fall, but there was no marked change; returned to her former allowance.

19*th*. A. M., 4½ o'clock, died.

Autopsy thirty hours after death.—Subject very fat. *Blood* dark colour; utter want of clot; deficient in fibrin and in red globules. *Brain* normal consistence; membranes congested; veins filled with dark blood; no appearance of an effusion into the ventricles or any other part of brain; brain structure everywhere healthy. *Lungs*, no sign of exudation at base; congested; back of right lung is more heavily congested than any other part, though lower lobes of both lungs markedly congested; portion of right lung sinks imperfectly in water, but is readily inflated, showing only congestion and some collapse; no exudation. *Heart* average size, but softer than normal; softening not found to be associated with any microscopical changes; fibres very well marked. *Spleen* enlarged, and darker hue than normal. *Liver*, nutmeg liver, congested, and slightly fatty. *Kidneys* larger than normal; tubular structure intensely congested. *Intestines* healthy; no disease of Peyer's gland; may be some congestion, and very slight prominence.

The very rapid feeble pulse, the great prostration scarcely influenced by the most active stimulation, the mind so clear at first, then becoming very dull, and the heightened noisy breathing gave to this case striking features. The peculiar condition of the respiration can certainly not be solely accounted for by any changes in the lungs. It is more purely a nervous phenomenon occurring in patients whose nervous systems have been overwhelmed by the fever poison. It may be a question whether the congestion of the lung sometimes associated do not become combined with collapse (as in Case V.), and thus the noisy breathing be explained. But if it be so, what causes the collapse? Certainly not the extent of secretion, which is slight; much more likely the enfeebled nervous forces. A further question suggesting itself is whether the presence of albumen in the urine of the last two cases be more than a mere coincidence; whether the impeded secretion of the kidneys likely to have been occasioned did not react upon the already enfeebled nervous centres, and thus give rise, or at least aid in giving rise, to the altered breathing? Another example of this kind of noisy breathing is afforded by a case further on reported (Case IX.), in which the kidneys were considerably affected, in which retention of urine happened, and in which, though there was pneumonia, the state of the lungs could not by itself explain the character of the breathing.

Urinary Secretion.—The urine was found to vary much in quantity and colour in the observations that were made. It is high coloured at first, but may become quite pale as convalescence begins, depositing an abundance of urates and phosphates. In several cases, far advanced in the fever, it was retained. In no case did its specific gravity reach above 1023; while 1014 to 1017 were much more common; 1010 was the lowest noted. As a rule, it preserved its acid reaction; but in several cases it was neutral, and in a few it was alkaline, or at least became so within twelve hours after it was voided. In most of the cases the chlorides were entirely absent or reduced to a trace; in some they remained normal; and in one they were plentiful throughout. During convalescence they return, but the specific gravity does not of necessity rise; it may even fall during their reappearance.

Albumen was detected in 8 out of 21 cases in which the urine was examined daily, or nearly daily, for this ingredient; but in one of these cases it may have been owing to previous renal disease; in another it was only discovered in one examination, and was a mere trace; in none was it really very abundant. The cases in which it was met with, with perhaps one exception, in which the most minute quantity was present, were severe cases, and among the eight cases there were four deaths, or, if we reject the case alluded to where it is probable that the kidneys were previously affected, three in seven cases proved fatal. But it cannot be said that in those exhibiting albuminous urine any very special prominence of delirium or stupor was observed. Yet I do not doubt that when the quantity of

albumen is large, and the secreting power of the kidneys much disturbed, that the want of power of elimination on the part of these important organs still further vitiates the blood and may show itself by more marked stupor or coma, by increased delirium, or even by convulsions, and under any circumstances the existence of albumen proves the blood to be considerably disordered, and must be taken into account in explaining the phenomena of a case and in determining its treatment.

Along with the albumen, and in repeated instances without it, tube-casts were found; the microscope also exhibited renal as well as vesical epithelium in the deposit with some of the salts of the urine. The tube-casts were in marked cases of the disease more often present than absent. They were either coated with rather opaque epithelial cells, many of which were finely granular, or were hyaline, or covered with granules, which, as Dr. Pepper, who tested them with reagents, informs me, were sparingly soluble in acetic acid, and which, with very high magnifying powers, did not present the round shape of oil. They are probably the urinary salts collected on the tube-casts, which themselves are an indication of the altered blood, and of the congestion and disturbed nutrition of the kidneys.

The extreme and early *loss of strength* is a very constant and characteristic feature of the malady. In some instances the patient was able to drag himself to the hospital, though he had reached the fifth day of the fever; but, as a rule, those admitted, even when they had been ill but a few days, could scarcely walk, and had been obliged to keep their beds from the first manifestations of the disease. The extreme debility persists throughout the complaint; and though it is not uncommon to find the patient very restless, and attempting to get out of bed, yet any appearance of strength he may show is fictitious, for, left to himself, he is very apt to fall to the ground, or to stagger back to and sink exhausted on his bed.

The loss of strength is generally greatest in those who exhibit marked tremulousness of the hands, or indeed of any part of the body. Sometimes the prostration may increase so rapidly as to lead to complete collapse.

CASE VI. *Typhus fever; delirium; sudden collapse, with huskiness of voice, similar to cholera; death.*—Edward L., æt. 25, admitted into the hospital April 10, 1865. Born in Philadelphia. After leaving college, at the age of 19, went to sea, and has served as supercargo on numerous long voyages. Two months ago a slight hacking cough commenced. He has had a chancre, followed by bubo in left groin, but has never noticed any secondary symptoms. His present attack came on five days ago with fever, headache, vomiting and purging, sore throat, and a diffuse papular eruption. The papules, he states, became vesicular, desiccated, and desquamated. But the preceding lines are all very doubtful, as he was far from being rational.

April 11. His eyes, which were slightly injected yesterday, are markedly so to-day. Tongue clean. Complains of frontal pain, but seems rational, save that he frequently expresses a desire to be buried in sand, to cure a diarrhœa which he says he has. There is an eruption visible on the chest

and abdomen; some of the spots being much modified by pressure, whilst others were hardly at all influenced; some spots were also seen on the arms, feet, and legs, but not so many as on the chest and abdomen. There is slight muscular tremour. Skin warm, but not hot. Belly meteoric. Pupils of moderate size; react to light, though not very actively. There are râles, dry and moist, none very fine, over back of lungs, but scarcely so many as when admitted. Some râles, with jerking, prolonged expiration, under right clavicle, and percussion note is less resonant there than under left. Heart-sounds normal as regards murmurs, but first sound is deficient. Pulse 120, and feeble. No vomiting. Bowels have not been opened since admission into hospital. Ordered liq. ammoniæ acet., aquæ camphoræ, āā f℥ss every fourth hour; beef-tea f℥ij every second hour; and a few ounces of whiskey in the shape of milk-punch.

P. M. Inability to void urine, which was drawn off; sp. gr. 1019; good quantity of chlorides; albumen in small amount, merely causing an opalescence; deposit contained granular epithelial casts, phosphates, with refracting granules. Some whiskey given during night, and beef-tea.

12*th*, 7 A. M. Found him in state of partial collapse. Hands blue and cold. Radial pulse scarcely to be felt. Tremulous movement of lower jaw, with a peculiar hoarseness or huskiness of voice, like the vox cholerica. Bowels have not been opened. External heat and stimulating frictions were immediately applied, and f℥iss whiskey given every hour until 10 A. M.; after that he took f℥j every hour, one hour with f℥j milk, the next with f℥ij beef-tea. No reaction, however, occurred. The eruption became much more copious. The urine, which was drawn off, was of sp. gr. 1013; chlorides almost absent; no albumen; but same microscopical appearances. The extremities remained cold, despite most powerful frictions and stimulation. Ordered f℥xxiv whiskey daily, and f℥j sp. chloroformi every second hour. Bowels were not opened. Belly meteoric; no gurgling, but he seemed to feel pain in iliac fossa. Huskiness of voice increased. Mind grew more and more heavy, and patient difficult to rouse. He died at 3 A. M., April 13; surface becoming very cold some time before death.

Autopsy seven hours after death.—Considerable cadaveric rigidity. Body much emaciated.

Thorax.—Lungs crepitant throughout, but deeply congested in lower lobes posteriorly. Heart healthy; contained small soft black clots. There were firm adhesions of pleural surfaces, especially on right side.

Abdomen.—Very little fat. *Liver* enlarged, congested, perhaps a little more fat than normal. *Spleen* very much enlarged, about thrice normal size; not very pulpy; containing no abnormal nuclei. *Intestines* presented some prominence of Peyer's glands, and congestion of mucous membrane, but no ulceration. The mesenteric glands were but slightly enlarged. *Kidneys* congested, with some tubes filled with granular epithelium and masses of granular urates.

Brain was healthy, not even congested. It was thought that the olfactory nerve was rather tough.

Blood was collected from right iliac vein, consisting of soft black clots and of fluid dark blood. The clots had numerous little white points on their surface, which proved to be aggregations of white corpuscles. The fluid blood contained *patches* of white corpuscles, which, when treated by acetic acid, cleared up, showing one, two, three, or four nuclei.

Headache is a symptom rarely absent. It is found among the pro-

dromes of the fever, or exists during the early period. It is referred either to the forehead or the back of the head. In not a single instance was it noted to have been acute or paroxysmal; and very rarely, indeed, is it intense, or more than a continuous dull aching. It does not last throughout the fever, and only during the first week of the malady does it form a distinct feature of the disease, or is apt to be complained of.

As in most epidemics of typhus, so in this, the mind is more or less affected, and *stupor* and *delirium* are common. But in a large number of cases the stupor is not very decided; there is rather sluggishness of mind, and at no time does the patient, when aroused, fail to give a correct and connected answer. Of 24 cases, in which the state of the mind was specially noted, there existed delirium in 10; in 8 dulness of mind and stupor were prominent symptoms; in the remaining 6 the mind was not confused, but remained clear, although perhaps not so active as in health. The *delirium* is generally quiet, more often muttering than active or noisy. In 4 of the 10 cases it was combined with great restlessness, and in one of these—and all were severe, though none fatal—the patient was delirious, talked and screamed, and tried so persistently to get out of bed that bandages had to be used to restrain her; in another the mental wandering was attended with very great restlessness at night, in fact with utter sleeplessness; in the third the patient moved about a great deal in bed, and once or twice left it; and it was much the same in the fourth. Sometimes the mental state and the character of the wandering are very peculiar. The extraordinary delirium of Case VI., who gave a very detailed and connected account of the symptoms prior to his illness, which undoubtedly was utterly incorrect, and whose real mental condition revealed itself by the constantly expressed wish to be buried in the sand, for the cure of a diarrhœa which did not exist, has already been mentioned. In another patient the mind appeared clear and the intelligence good; she seemed to have a perfect cognizance of her condition, answered any questions rationally, but, as evening came on, became restless, got out of bed, and was in a state of intense nervous excitement, expressing herself as having committed sins which could not be pardoned, descanting on the general consequences of sin, and the Almighty's mercy. These hallucinations occurred two nights in succession.

The delirium was in only one case, and that a somewhat doubtful one, noticed at the very beginning of the malady. It generally comes on in the second week, as the headache passes off. It is not in itself a dangerous symptom. It was present in 3 of 5 fatal cases; in 1 the delirium was muttering, associated with stupor gradually deepening into coma; in 1 the delirium, too, was muttering, but the patient was still capable of being aroused on the morning of the day he died; and in 1, a case (Case VI.) just described, the peculiar state of mind continued until collapse occurred.

In the remaining 2 of the fatal cases the mind was dull and stupid in one; the other one presented the extraordinary phenomenon of its remaining clear to the last hours of life.

CASE VII. *Typhus fever, with great prostration; mind remains clear; hiccough; husky voice; death.*—William W., coloured, a sailor, æt. 35, admitted into the Pennsylvania Hospital, April 10, 1865. No history could be obtained, excepting from the answers he himself could make. According to his own account, he had suffered for eight days from pain, cough, diarrhœa, and anorexia.

April 11. Suffusion of both eyes, with small pupils; bowels freely opened six times daily; tongue coated, dryish; pain in stomach, which is meteoric; mind clear, though sluggish; pulse 120, feeble; constant hiccough. He was freely nourished and stimulated from the first, taking beef-tea f℥ij every two hours, and f℥xij whiskey. He was also placed upon acid. nitromuriatic. gtt. vj in aq. camphoræ f℥ss every four hours.

12*th.* Last night, finding the hiccough continue, an opium suppository of gr. j was introduced, and he was put upon the use of chloroform gtt. v every two hours. This morning he still hiccoughs, though less than before the suppository and chloroform were given. Pulse is small, 124; tongue dry in centre, and coated; skin less hot; bowels six times opened since yesterday. Urine had to be drawn off, and was found to be of sp. gr. 1023, acid reaction, chlorides almost absent, and with a decided, though small amount of albumen; it was of high colour, and deposited granular and hyaline casts, and granular epithelium. Towards night, as the hiccough obstinately persisted, ol. succini gtt. v every three hours was ordered; the whiskey was increased to f℥xviij daily.

13*th.* Tongue slightly coated, moist, and very tremulous. Hiccough continues, but less violent, and apparently somewhat influenced by treatment. He has had three passages since last night, one involuntary this morning. Urine still requires to be drawn off by catheter, and is of sp. gr. 1020, high colour, acid reaction, chlorides very deficient, and a small amount of albumen. Pulse 144, very small and feeble. Extremities very cold. Ordered quiniæ sulph. gr. xvj in divided doses, and increased whiskey to f℥xxiv.

14*th.* Rapidly sinking. Constant tremulous movement of lower jaw and tongue. Hiccough has almost ceased. Eyes are fixed, with but little expression, and yet mind seems clear, although he appears nearly in articulo mortis. Involuntary discharges both of urine and a thin yellow fecal matter. Pulse extremely feeble, and too rapid to count. Respiration very rapid and shallow. Abdomen meteoric. Extremities as cold as if he were dead. Towards evening vomiting came on. For past 48 hours there has been a peculiar huskiness of the voice, which increased so long as he was able to articulate. These ominous symptoms aggravated through the night, the intense coldness of extremities advanced towards trunk, the pulse grew more and more thready and rapid, deglutition became impossible, and at 12 M., April 15, he died.

Post-mortem examination five hours after death.—Marked cadaveric rigidity. Body not much emaciated, though features were singularly pinched.

Head.—No congestion of vessels of scalp or calvaria. The large veins over convexity of brain filled with dark blood. Brain substance apparently healthy. No abnormal effusion into ventricles, nor thickening of membranes.

Thorax.—*Lungs* were crepitant throughout; much congested in posterior part of lower lobes. *Heart* of good consistence; contained several clots, those in auricles being soft and dark, whilst in left ventricle there was a tough, very irregular, fibrinous clot.

Abdomen.—*Liver* somewhat enlarged and congested; when examined under microscope, the cells were found to have preserved their nuclei in every case, and contained no excessive amount of fat. There were firm adhesions between convex surface of liver and under surface of diaphragm. *Stomach* was of average size; exhibited a somewhat thickened condition of its walls, especially the mucous surface, and a marked enlargement of the villous coat towards cardiac extremity. *Spleen* was about half as large again as in health, dark, and soft. *Kidneys* were of normal size, somewhat congested, and in one or two parts presented a decided decrease of the tubular portion. When examined minutely, the Malpighian bodies and capillaries were found to be only moderately congested; but the epithelium contained an abnormal amount of granular fat, and in places the tubes were clogged with granules. *Intestines.*—Considerable dark congestion of colon; congestion of lower portion of small intestine; with enlargement of solitary glands, and congestion, though not tumefaction, of many of Peyer's patches.

The *blood* was dark, either fluid or forming soft dark clots; contained an abnormal number of granular corpuscles, which, when treated by acetic acid, revealed from one to four nuclei. The red corpuscles were crenated, and did not form themselves properly into rolls.

Irrespective of the singular state of mind of this patient, the hiccough requires to be noticed. This is a very rare symptom in typhus fever, and generally happens only in the gravest examples of the disorder. But it is doubtful whether it can in this case be attributed to the febrile malady. To say the least, the organic disease of the stomach and the adherent diaphragm, neither of which appeared recent, acted as predisposing causes.

Deafness was noticed to exist, to a greater or less degree, in 8 out of 21 cases, 2 of which proved fatal. It may or may not be connected with buzzing in the ears. It could not have been, as has been suggested with reference to the occurrence of this symptom, due to quinia, since, at the time it was observed, the patients were not taking this medicine. In 5 of the 8 cases there was coexisting delirium; of the other 3 the mind was sluggish in 1, very dull (and the deafness in this case was very great) in 1, and in 1 it was little if at all affected, though here, too, the deafness was very marked.

Epistaxis is scarcely regarded as a symptom of typhus fever. Most writers barely allude to it as among the possible signs of the malady; few have met with it. Yet in this epidemic it occurs in about one-fourth of the cases, the same proportion in which Jacquot encountered it during the Crimean war. I have noted it in 8 of 31 cases. In only one was it profuse. It took place in all excepting one during the earlier part of the disease, though in one it recurred almost to the end. In 1 it lasted during one day, and the blood came from both nostrils; in 2 the nose bled repeat-

edly, and at intervals of several days. The cases in which it was found were the graver ones. In 6 of the 8 there was also diarrhœa.

The frequency of epistaxis is all the more remarkable from the rarity with which other hemorrhages happen. I have not as yet seen a single instance of hemorrhage from the bowels or the gums. Nay, even sordes on the teeth and lips, due as they so often are to slight admixture of blood with the cast-off epithelium, were not unusually common.

Complications.—The most ordinary complications observed in this epidemic are *pneumonia, erysipelas,* and *parotid swellings;* others, too, occur, such as *pharyngitis* and *gangrene of the feet,*[1] but these were met with but in single instances, while several of the former were encountered.

True pneumonia was seen in 3 out of 32 cases. In two of these it was limited to the posterior lobe of one lung, and there was coexisting bronchitis of the other; in the third case it was double, or to speak more accurately, it affected, as true lobar pneumonia, one lung, while the other showed only signs of partial consolidation, with marked hypostatic congestion and bronchitis.

CASE VIII. *Typhus fever complicated with double pneumonia; recovery.*—Mary T., mulatto, æt. thirteen, the daughter of a man who had just left the hospital convalescent from typhus, was admitted on March 3d, 1865. She was taken sick, February 24th, with headache, pain in breast, diarrhœa, bad taste in the mouth, and anorexia. When admitted, on the seventh day of her illness, her symptoms were: headache, but no pains in the limbs; great heat of skin; six to eight watery discharges from the bowels; tongue coated with a whitish coat; flush on both cheeks perceptible through the dark skin; injected eyes; slight cough; pulse 118, and rather feeble. Was ordered plumbi acetat. gr. ij, every sixth hour; beef-tea six oz., and milk freely.

March 5. Tongue still coated; diarrhœa better, only two passages last twenty-four hours. 7 P. M., pulse 128; continue pills.

6*th.* Pulse 132; no passage since yesterday morning; tongue coated, but less so; restless, almost sleepless night; eyes not so suffused or injected. Two oz. of whiskey daily, added to her milk diet.

7*th.* Pulse 136; coughs a little; one passage since yesterday morning; skin cool; mind wanders; tongue still slightly coated, yellowish-white, substance unaltered, perhaps redder than usual. Urine sp. gr. 1020, acid reaction, the merest trace of albumen, more perceptible with nitric acid and heat than with nitric acid alone or heat alone. Ordered whiskey increased to 4 oz. daily; acetate of lead pills stopped; ol. terebinth. gtt. x every fourth hour.

8*th.* Complains of much pain on pressure in the right iliac fossa; bowels not opened for two days; 9 A. M. pulse 140, feeble; 6 P. M. pulse 144.

9*th.* Mottled spots, some darker than others, found principally on chest and abdomen, little, if at all, influenced by pressure. General abdominal tenderness, but tenderness more marked perhaps in the right iliac fossa; tongue clean; delirious during the night, but better this morning; pulse

[1] Case for which amputation of the leg was performed at the Pennsylvania Hospital, and described by Dr. Andrews in July number of this Journal, 1864.

124. Ordered poultices medicated with laudanum to be applied to abdomen; whiskey increased to ℥vj; turpentine continued.

10*th*. Pulse 112; bowels opened twice by a teaspoonful of castor oil; sleeps well; tongue cleaning; less pain in abdomen; flush visible on cheeks; cough, which has been slight all along, is now marked; tenacious, but not rusty-colored expectoration; the respirations have become frequent, 40 to 42, and there is great dulness with tubular breathing on right side posteriorly, no dulness anteriorly; fine crepitation at the back of left lung; left cheek seems most flushed; tongue moist, losing its coat. Ordered, in addition to previous treatment, quin. sulphat. gr. ij four times daily in a mixture of spir. eth. nitr. and syrup prun. Virg.

11*th*. Pulse 111; respiration 48; percussion dulness still marked on right side; distinct tubular respiration; vocal fremitus increased on right side; fine crepitation still heard on left side; urine of dark amber colour, acid reaction, sp. gr. 1022, no albumen, a slight diminution of the chlorides. Ordered turpentine stupes and poultices to be used; continue whiskey six oz. daily in milk, and beef-tea.

12*th*. Pulse 112 to 118; respiration 46 to 48; only slight impairment of resonance on left side, with some crepitation and imperfect blowing respiration. On the right side crepitation is now becoming rather coarse, and tubular breathing less well defined; flush on left cheek is still more distinct than on right; complains of pain on pressure on right side of abdomen; mind clear; tongue clean and moist, yellowish-white coat.

13*th*. Pulse 104; respiration 36 to 40; tubular breathing losing its distinctness; râles increasing, somewhat coarser in right lung; sputum adherent, but not rusty-coloured, and in small quantities.

14*th*. Pulse 102; respiration 26 to 28; tubular respiration losing its distinctive character; sputum tenacious, rather thicker than yesterday.

16*th*. Pulse 104; respiration 28; dulness very much disappeared; breathing lost its tubular sound; sputum less tenacious, and is more copious.

17*th*. Pulse 88; respiration 28 to 30; only slight impairment of resonance still perceptible at lower portion of left lung and middle of right; few coarse moist râles with vesiculo-bronchial respiration on right side; no tubular breathing; flush on cheek disappeared; cough diminishing.

19*th*. Pulse 108; tongue still slightly coated, but patient is convalescing.

21*st*. Pulse 104. Reduce whiskey to two oz. daily.

22*d*. Pulse 96; respiration becoming more and more vesicular and normal; strength increasing.

30*th*. Discharged well.

In this case the inflammation of the lung succeeded gradually to the hypostatic congestion. The pulse remained for some time, and probably as the exudation was taking place, at upwards of 140; this phenomenon was equally observed in another patient, a girl of ten years of age, treated too with quinia and turpentine, and in whom recovery also took place. The same fortunate result did not happen in the following case, a man of fifty, but who, in addition to the pulmonary complication, had previously existing disease of the heart and kidneys.

CASE IX. *Typhus fever; diarrhœa; pneumonia of one lung; bronchitis and congestion of other; noisy breathing; retention of urine; death.* —George L., æt. 50, admitted April 11, 1865. Born in Bucks County, Pa.

Seaman. Has been dull and feeble for a week, with some frontal pain and general soreness; anorexia; bowels opened twice daily; had a decided rigor about a week ago; coughed occasionally, with mucous expectoration; no epistaxis; a little pain in abdomen.

April 12. Tongue dryish, with very light fur; papillæ prominent and distinct. Pulse 120, of fair volume, but compressible. Eyes suffused, with small pupils. Belly large and meteoric. Bowels opened three times during night; thin passages. Mind perfectly clear. Considerable cough. Eruption on abdomen. Treatment, acid. nitro-muriatic. gtt. vj every fourth hour. Beef-tea and milk-punch.

13*th*. Eruption over chest and abdomen; a few doubtful points on arms; some on legs. Those of lightest red are very much modified by pressure; they appear coarser and larger than typhus fever eruption ordinarily is. Bowels loose; two or three passages during night. Cough, with few bronchial moist râles on left side. No dulness on percussion. Tongue moist and slightly coated. Pulse 120.

14*th*. Pulse at least 120; intermittent. Respiration 36. Tongue coated and dry in centre; rather moist toward edges. Bowels opened twice; small, thin passages. Urine free; sp. gr. 1015, acid, deficient chlorides, considerable albumen, blood, granular epithelium, crystalline casts, with few tube casts. Eyes suffused; pupils small. Belly large but supple; eruption as before. Coughs considerably, with mucous expectoration. Excessive feebleness of heart's action. Pulse irregular in rhythm, occasionally dropping a beat, and the beats varying in duration. Coarse, moist râles over left side anteriorly, and posteriorly low down. Harsh blowing, but not true tubular; breathing heard over right scapula. Ordered quiniæ sulph. gr. xvj daily in two-grain doses. Whiskey f℥xviij. Beef-tea and milk continued.

15*th*. Delirious; muttering, but readily roused, and, when questioned, answers correctly. Tongue moist. Pulse 122; very compressible. Some dulness of hearing. Belly large and supple. Eruption same. Bowels opened four times; stools of mush-like consistence.

16*th*. Passed a restless night. Respirations 40. Pulse 130. Tongue moist at tip; brown and dry in centre. Considerable muscular tremor, and constant trembling of lower jaw. Bowels opened once, not a formed stool. Retention of urine; when drawn, is of sp. gr. 1015, alkaline, deficient chlorides, considerable albumen, fragments of casts. Dulness on percussion posteriorly on right side, and harsh blowing respiration mixed with large râles. A good deal of cough with tenacious sputum. Eruption same. Toward night he became much worse. Deglutition was impossible. Pulse very rapid and full. Retention of urine continued. Respiration laboured, noisy inspiration, with puffing expiration. Urine drawn off. Ordered beef-tea and one ounce of whiskey by enema every two hours.

17*th*. Condition unchanged. Is too weak to discover condition of lungs. Has had one passage from bowels, and passed some urine at same time, but about f℥x were drawn off. Unable to protrude tongue. Pulse very feeble—over 130. Belly large and supple. Respiration 45, with same characters as last night. Skin only moderately warm. Entirely unable to speak, but looks at you when spoken to. Ordered beef-tea and whiskey continued; quinia gr. vj every six hours; also beef-tea f℥ij, yelk of one egg, f℥iss whiskey every three hours by enemata. Died at 12 M.

Autopsy.—Blood diffluent; numerous white corpuscles.

Heart dilated; fibres pale, granular, and friable, with abundance of free fat.

Lungs. The posterior part of right lung was dense, and it was found to sink in water. Left lung congested but not consolidated.

Kidneys large; somewhat congested; cortical portion much increased; very granular casts in tubules.

Intestine showed congestion of colon, and prominence of the solitary glands, with some congestion and prominence of Peyer's patches, but not the least appearance of deposit or ulceration.

Erysipelas is a serious, but not necessarily fatal complication. In none of the cases observed did it occur excepting on the face. It appeared as the fever was approaching its termination, or even after commencing convalescence.

CASE X. *Typhus fever, complicated with erysipelas; repeated epistaxis; parotid swelling; death.* — John C., æt. 23, admitted into the hospital April 1, 1865. Seaman; made his last voyage from Liverpool to New York; came directly to this city after landing. About two weeks ago, while boarding in a house in Pine Street, was, to use his own language, on a drunken spree, and while recovering, felt the prodromes of the present attack—languor, headache, &c. Since that time he has been confined to bed. Has had considerable diarrhœa (ten stools daily); repeated epistaxis, principally from right nostril; total anorexia; great prostration; frontal headache; vomiting about a week ago. The stools have been very fluid and offensive.

Condition shortly after admission: Tongue moist and clean; skin hot; countenance dull, with congestion of both eyes; answers are slow but correct; slight deafness. Pulse 114, feeble. Respirations accelerated. Cough, with mucous expectoration, and with fine râles over lower posterior part of both lungs. There are a number of spots over surface, some of which he ascribes to an attack of scabies which he had some time since.

April 2. In the same condition. Has had two stools, dark and consistent. Respiration 18. Pulse 108. Coughs considerably. Eruption is a coarser red, not much influenced by pressure, and most abundant on abdomen. Has taken beef-tea and milk-punch, āā f℥ij every fourth hour. Quiniæ sulph. gr. viij daily.

3*d.* Intelligence about the same. Eyes still congested; pupils small. Respirations heavy, 20 in the minute. Pulse compressible, 112. Tongue clean but dry; some sordes on lips. Has had quite a free epistaxis this morning. Eruption same as yesterday. Much less cough. Bowels opened once; stool feculent, rather soft, and light-coloured. Urine sp. gr. 1011, acid, no albumen; deposit of premature epithelium and a few mucous corpuscles.

4*th.* Pulse 114. Tongue coated and dryish. Eye still congested. Eruption the same. Bowels opened twice during night. Pupils small. Occasional cough, and fine, dry râles at postero-inferior part of lungs.

5*th.* Pulse 120; rather feeble when sitting up. Bowels opened frequently and copiously. Tongue dry and coated. Mind tolerably clear. Eye still suffused. Eruption still very visible. The same amount of whiskey, ℥viij to ℥x daily in milk; beef-tea and quinia continued.

6*th.* Dull and drowsy. Skin less hot. No more epistaxis. Pulse 112, compressible. No subsultus. Eyes suffused, but less injected. Tongue very dry; black crusts in centre. Sordes on lips. Rare cough. Belly normal. Eruption same. Bowels open three times during night, once this morning.

There are a few dry and moist râles over posterior part of left lung below ridge of scapula. One of cervical glands at right angle of jaw is swollen. Urine, sp. gr. 1012; chlorides almost absent; no albumen; light flocculent deposit.

7*th*. Much the same. Still dull and stupid. Pulse 108, of deficient volume. About four passages in twenty-four hours.

9*th*. Heavy and drowsy. Tongue moist and well-shaped. Bowels opened three or four times during night. Pulse 100. Eyes less congested. Stop acid, and give tr. terebinth. gtt. x every fourth hour in mucilage. Skin moderately warm. Urine free. The small abscess at right angle of jaw has opened and discharged freely. Ordered tr. opii gtt. xxx by injection late in day. Discharge from left ear.

10*th*. Eye almost clear; pupil small. Tongue dry. Respiration 22. Pulse 108, large, but quite compressible. Skin moderately warm and moist. Bowels opened about twice during night, passages being watery, with normal-coloured fluid feces. Little cough. He has been occasionally delirious since yesterday morning, and is very dull. Lungs are full of snoring and cooing dry râles, and large moist râles. Turpentine stupes; tr. opii gtt. xxx by injection.

11*th*. Dorsal decubitus. Face rather pinched. Eyes sunken; conjunctivæ clear; pupils rather small. Skin inclining to be cool. Tongue dry and glazed. Pulse 108, large, but compressible. Slight dulness of hearing. Belly meteoric. Bowels less frequently opened; ochre-coloured fluid stools. Lungs less full of râles.

12*th*. Less hebetude and deafness. Tongue not so dry and coated. Eye clearer. Belly still meteoric. Bowels are freely opened. Skin pleasantly warm. Coughs considerably, but rather less. Pulse 108, of good volume, and more force. Slight purulent discharge from left ear. He has vomited occasionally in last few days. Urine, sp. gr. 1017, no chlorides, decided albumen. Free fat, granular epithelium, hyaline tube-casts, and entirely granular casts.

13*th*. Bedsore forming over sacrum. A large external pile has also appeared. Bowels freely opened three times during night. Tongue moist and clammy; quite clean; sordes. Belly flat; no gurgling or tenderness. Pulse 96, compressible. An erysipelatous blush has appeared over bridge of nose extends to malar bone on each side, with some tumefaction. Still coughs. Mind dull, but not restless or delirious. Urine of last night sp. gr. 1013, alkaline, chlorides almost absent, no albumen, pale amber, globular urates, and triple phosphates. Increase whiskey to f℥xviij. Apply sulphite of soda locally—solution of gr. xv to f℥j aquæ. Give turpentine every three hours. 12 grs. quinia daily. Towards night he vomited occasionally.

14*th*. It is with difficulty that the application can be kept in place on his face, but it has been renewed constantly. Erysipelatous redness and swelling have extended about an inch in every direction. Bowels opened four times, passages being thin. Skin cool. Pulse 105.

15*th*. Tongue glazed and dryish. Skin moderately warm and dry. Pulse 105, large, but compressible. Bowels opened five or six times very copiously. Erysipelas has not extended on left side of face, but on right side it has advanced to ear, and there is also hard swelling of right parotid. Argent. nitrat. gr. x to f℥j to part.

16*th*. Another attack of epistaxis. Bowels opened five times; passages but moderately thin. Belly meteoric. Tongue soft, with patches of white

coat. Eyes clear. Hearing very dull. Pulse 108, of fair force. Right parotid very much enlarged. Some puffiness over left angle of jaw.

17*th.* Bowels opened several times. Urine free. Gums not spongy; no salivation. Perfectly deaf, but intelligence seems good. Eyes brighter. Tongue clean—merely dryish. Belly scaphoid. But little cough. Pulse 108, fair volume and force. Swelling at angle of jaw increased; tense and elastic; no signs of fluctuation.

18*th.* Intelligence good, although he is very drowsy. Tongue clean and moist. Pulse 96. Belly flat. No passage since early morning. Right parotid still very large; somewhat elastic, but not very hard. Right ear discharging freely. No enlargement of left parotid. Right parotid is even less hard than yesterday. Fomentations applied, but not steadily kept up. Erysipelatous redness is much less distinct.

19*th.* Less deafness; intelligence good. Tongue clean and soft. Pulse 104, gaining strength. Skin moderately warm. Bowels freely opened. Erysipelas almost gone. No desquamation yet. Right parotid much less hard in front of ear. Discharge from ear continuing. Respiration noisy; at one time only 15 in minute; entirely through his nose. Bedsore over sacrum.

20*th.* Pulse 130; small and feeble. Considerable vomiting. Bowels freely opened three times. Skin moderately warm. Belly retracted. Eyes clear. Very great deafness. Free discharge from right ear. Right parotid less tense. Tongue dry; somewhat glazed. Vomiting ceased toward night. Stop turpentine. Erysipelas returning. Ordered ferri perchloridi gr. $\frac{1}{4}$, every second hour; other treatment continued.

21*st.* The night-nurse reports that he has had no vomiting. Has taken his stimulus and medicines well, but at 8 A. M. he appeared to suddenly fail. His countenance was nearly hippocratic. Pulse very small, 132 in minute. Hands cool and clammy, although remainder of surface was warm and dry. Bowels thrice opened; small, thin passages. Belly scaphoid. Right parotid much diminished in size, discharge from ear continuing. Last night he got out of bed, climbed on table, and fell violently on floor. He steadily sank after this, and died at 10 A. M.

Autopsy six hours after death. — *Brain* healthy. *Thorax.* Lungs deeply congested postero-inferiorly, especially on right side. No pleuritic adhesions nor effusion.

Liver large, very pale, with yellowish tinge, and on examination, cells found to be very fatty. *Spleen* but slightly enlarged and quite firm.

Kidneys pale, and, when examined, some tubes were seen, with their epithelium, cloudy and granular, though the majority were typically healthy.

Intestines. Some congestion of large bowel; in small intestine, Peyer's patches were rather prominent, and there was some enlargement of the solitary glands, but not the least irregularity or sign of ulceration. The mesenteric glands were considerably enlarged, pale and firm.

Blood was dark and fluid; contained about three times as many white corpuscles as in health, which inclosed two and three nuclei. The red corpuscles were evidently unhealthy, as there was no perfect formation of rolls, and the colouring matter was too easily dissolved out by water. The bladder contained a considerable amount of urine, which was amber-coloured.

Upon laying open seat of parotid, it was found that the gland had suppurated, discharging itself through ear.

In this case the erysipelas was associated with *parotid swelling*, itself a not unfrequent and a dangerous complication of the fever. This complica-

tion happened in 5 out of 50 cases, two of which died. In one it affected merely one gland, in four, both. The former case recovered; and so did two of the latter. In one of these, a boy, 14 years of age (R. B.), the swelling was enormous. It appeared, as indeed these swellings usually do, just as the fever had begun to decline. Various local means were tried to backen the tumefaction, or cause its absorption—iodine, belladonna, mercurial ointment, a freezing mixture—but all in vain, they had no effect. The glands both suppurated; and suppuration was favoured by fomentations and poultices. The first discharge came through the ears, and the glands were subsequently opened. The following is a similar instance:—

CASE XI. *Typhus fever with parotid swelling; absence of chlorides from the urine; recovery.*—Sallie McG., æt. 7, living in a neighbourhood from which numerous cases of typhus fever have been brought to the hospital, was admitted April 3d, 1865. Imperfect history only could be obtained; has been sick about nine days (according to her sister's account she was only sick for two days, then grew much better, was up, and relapsed). She now presents: sordes on teeth; eyes suffused and watery, slightly injected; tongue dryish, imperfect yellow coat; skin moderately hot; pulse 120; bowels inclined to be loose; mind quite clear; eruption general, not very distinct. Ordered acid. nitro-muriatic. gtt. iij every fourth hour. Ol. terebinth. gtt. v every fourth hour, beef-tea, and milk.

April 4. Dull; cheeks flushed; eyes slightly injected; tongue moister; bowels costive; pulse 120; eruption indistinct; urine sp. gr. 1015, acid, no albumen, chlorides absent, no deposit.

5*th*. Brighter; eyes less injected; tongue becoming moist; urine retained for twenty-four hours, sp. gr. 1016, acid, chlorides absent, no albumen.

6*th*. Brighter; eyes scarcely injected; tongue moist, slightly coated; urine passed freely; bowels costive; pulse 104, gaining strength; good appetite. There is no hepatization of lung to account for absence of chlorides; she has an occasional hoarse cough, which is apparently tracheal.

7*th*. Cries a great deal, owing to an inflammation of the gland near right angle of jaw; passed an uneasy night; has had an ounce of oil, but bowels have not been opened; tongue well shaped, moist and clear at edges and tip, coated in centre; passes water freely, and drinks a great deal of water; appetite poor; sordes on teeth and lips; pulse 120, small, but of good force; respiration 22 to 24; no blowing respiration, breathing can scarcely even be called harsh; percussion note clear. 8 P. M. The swelling at angle of right jaw has involved right parotid, anterior part of neck, and glands at left angle. Urine sp. gr. 1014, neutral, no albumen, normal colour. Ordered acid stopped, quiniæ sulph. gr. v daily, sol. argenti nitrat. gr. x to f℥j applied locally.

8*th*. This morning the swelling seemed a little less, but toward night it has increased; pulse 124; tongue slightly coated; bowels opened; child less restless, but still cries a great deal; urine neutral, sp. gr. 1014, chlorides returning, but urine merely rendered opalescent, no albumen, normal colour.

9*th*. Passed a better night, but is restless again this morning; tongue moist with white fur in patches; pulse 95, of good force; bowels opened; swelling on left side less; right eye is closed, but there is a decrease in swelling of right parotid; urine sp. gr. 1009, chlorides still very deficient, no albumen.

10*th*. Tongue soft and moist; swelling both of parotid and of neck very

much diminished; bowels costive; some appetite; on left side swelling has almost disappeared, on right side the gland is tumid; she allowed for the first time a poultice to remain through night; gland is painful to pressur but less resistant; no eruption visible, but here and there a slight di colouration of the skin.

11*th*. Tongue soft and moist, with patches of white fur; pulse 95; urin sp. gr. 1017, chlorides increasing, no albumen, deposit of urates; but litt appetite; bowels opened once by fʒss ol. ricini; her expression is muc better, and she is brighter and less peevish; there is no longer any swellin on left side, while on right it has much diminished anteriorly, so that sh can open the right eye without difficulty; but just in front of ear and a angle of jaw there is still considerable swelling. On examining fauce the right tonsil and wall of fauces project considerably into throat, formin a firm, elastic, non-painful tumour, which, however, does not interfe materially with deglutition. The solution of nitrate of silver was applie externally night and morning until last night; no application being mad this morning; there is not the slightest salivation; urine sp. gr. 1017, neu tral, or nearly so, no albumen, chlorides increasing, urates.

12*th*. Free discharge from right ear; integument is purplish and tens below and in front of mastoid process; passed a very restless night, cryin with pain; pulse 85; skin cool; bowels regular; tongue clean and moist urine sp. gr. 1017, marked increase of chlorides, no albumen.

13*th*. Left side presents no abnormal appearances, even small glands hav gone back to natural size; discharge from right ear increased; swellin seems to point below ear, with distinct fluctuation; abscess opened freel by incision; urine sp. gr. 1017, slightly acid, abundant chlorides, no albu men, deposit of uric acid, granular matter.

14*th*. Abscess under right ear has discharged freely a thick pus; tongu soft and clean; pulse 90; appetite fair; she is very peevish and fretfu moaning constantly.

15*th*. Pulse 96; skin cool and soft; tongue clean and moist; absce discharging freely; appetite fair.

16*th*. Abscess discharging freely and rapidly diminishing.

18*th*. Abscess discharging freely and a considerable amount of sloug has become detached; child is much emaciated, and very nervous.

29*th*. A considerable portion of gland appears to have been discharged suppuration ceased April 24th; since then the hole left by separation o slough has been filling up; child's strength and appearance very much im proved; gums firm, and there has been no salivation; appetite excellent runs about all day. In this case the nitrate of silver did not seem to hav caused the least diminution or recession of the swelling—certainly not o the side almost wholly affected.

Here, too, the discharge came first from the ear, and the gland speciall affected suppurated. This, in my experience, is the most desirable termin tion. Were it not that to go here more fully into detail would prolon this paper to limits ill-suited to the pages of a journal, many cases migh be added, observed on other occasions, to show how little likely it is that absorption of the exudation will take place, and how apt parotid swellings are then to end in death. I do not refer so much to one-sided tumefaction, which always presents a far more favourable prognosis, but to those in which both glands are involved. When such cases terminate fatally the

parotid glands are found to be swollen and hard; on section a glairy fluid exudes from them, in which the microscope finds many granules, some granular nucleated cells, but very few pus-globules.

There is one more complication which I may notice, that in which *contraction and rigidity of the muscles* and very marked *cerebro-spinal symptoms* happen. I observed this in one striking instance. But let the case speak for itself.

CASE XII. *Typhus with rapidly occurring muscular rigidity and opisthotonos; death.*—Timothy S., a mulatto, age 22, who had been in the surgical wards of the hospital for upwards of a month, was transferred for chills and fever to the medical ward on Feb. 29, 1865. Notwithstanding that he took twelve grains of quinia daily, he had several successive chills recurring at about the same time of day, but otherwise there was nothing noticeable about his condition. He ate his food and appeared as well as usual.

On the 6th of March he complained of feeling sick at his stomach, for which he was allowed some lime-water with whiskey; and he was placed on milk and broth, and eggs as diet.

He continued feeling sick all day of the 7th; was listless, indisposed to talk, nor did his answers seem as rational as usual. Towards evening he became very restless, is stated to have spoken incoherently, and was constantly getting out of bed, running round the ward and disturbing the other patients; so restless in truth was he that at a very early hour on Friday morning he was fastened to the bed by the nurse.

When examined on the 8th, at the morning visit, he was found to be comatose, and his head drawn back. His eyelids were wide open and remained so; the pupils reacted sluggishly; the bladder was emptied by a catheter; the urine contained not a trace of albumen, but a large quantity of urates and phosphates; the pulse was feeble and very frequent. He remained much in this condition all day, seemingly hearing when spoken to, but taking no notice; with his eyes wide open, and a film from secretion covering them; the pulse did not change much, it was about 140; the first sound of the heart was almost extinct. But what was most striking was the position of his body. He lay with his head drawn very much backwards; his extremities rigid; the abdomen contracted; in fact there was complete opisthotonos, and the whole body could be raised by placing the hand at the back of the head and lifting it. He was stimulated as freely as possible, taking at one time six ounces of whiskey in the space of four hours; turpentine, ten drops every second hour, and carbonate of ammonia were also given; and as towards evening there seemed to be difficulty in swallowing he was nourished through a stomach tube.

On the 9th he was much in the same condition, occasionally he would mutter a few words and seemed brighter, but there was no real improvement in any of his symptoms; the pulse was very rapid; and his urine, owing to inability to void it, was repeatedly drawn off by the catheter. No paralysis of the limbs existed; and no eruption could be discerned on his dark skin. In the evening he died.

Autopsy sixteen hours after death.—*Brain* of firm consistence, and healthy appearance of brain structure; it was very slightly congested, as was judged by a fair number of red points being visible in the sections. The vessels of the membranes were moderately full of dark blood. But nowhere

was there the least sign of an opacity, or of exudation. Normal amount of fluid in ventricles.

Spinal cord was also of firm consistence and healthy appearance, and its membranes were only slightly, if at all injected.

Thoracic viscera: Lungs pale, anæmic looking; heart normal consistence, pale colour.

Abdominal viscera: Kidneys, spleen, and liver seemed healthy; bowels contracted, and some *post-mortem* intussusceptions; but mucous coat normal.

Blood dark looking, coagulated imperfectly.

In this extraordinary case, in which the *post-mortem* examination threw no light on the cause of the gravity of the symptoms, there were the most obvious cerebro-spinal phenomena; so obvious that the case will by many be looked upon as one of "spotted fever." But it happened in a man who had been for weeks in the hospital, and who was in a ward in which there had previously been several typhus fever patients, and where the nurse not long afterwards was seized with an attack of the fever, which proved also rapidly fatal. Yet, though I believe the disease to have been typhus fever to which either in consequence of the influence of the poisoned blood, or of the direct effect of the poison on the cerebro-spinal system, peculiar features were imparted, I have not included the case in the analysis of any of the symptoms made in this paper, so as not to vitiate the results arrived at by what might be regarded as a doubtful illustration of the malady.

Anatomical Lesions.—The lesions detected have been mentioned in connection with the fatal cases; but we may here briefly group them together. The most constant and significant change is the altered condition of the *blood.* It is much darker and more fluid than natural, and either perfectly diffluent or forms soft, black clots. It contains an increased number of white corpuscles, and the red are for the most part crenated and do not properly shape themselves into rolls. The white corpuscles inclose from one to four nuclei, which become readily apparent on the addition of acetic acid.

In no instance was any sign of inflammation of the *brain* discovered, or did the brain-substance itself look other than healthy. There was no effusion into the ventricles, nor was even congestion of the membranes a constant feature: in only a few instances were the veins on the surface filled with dark blood.

The *lungs* are commonly in a state of hypostatic congestion, yet crepitant. They are susceptible of inflation, though with more difficulty than in a healthy condition, and when inflated their dark colour disappears to a great degree. Portions of them may sink in water and be condensed by collapse, as in Case V., or consolidated by exudation, as in Case IX.

A markedly softened condition of the *heart* was only observed in one case, if we except Case IX., in which the morbid cardiac phenomena were very likely caused by disease prior to the fever.

Enlargement of the *spleen* is the rule, and the organ is usually darker and softer than in health. But there are no abnormal elements in its pulp.

The *kidneys* are generally congested; though a marked exception to this is reported in Case X. The tubular structure is clogged with epithelium, with tube-casts, and with granules, probably the urinary salts which collect on the tube-casts.

As much of the interest of the cases turned on the enteric symptoms, the *intestines* were in every fatal case very carefully inspected; and not in one was there the least appearance of a deposit in the solitary glands or in Peyer's patches, or of softening or ulceration of these structures; in other words, not a single case presented anything like the peculiar lesions of typhoid fever. Congestion of the lower portion of the small intestine, or of the colon, was the most common condition, and the solitary glands were more or less congested, and looked somewhat swollen and prominent; and when examined microscopically were found to be filled with blood. But we must recall the fact that severe diarrhœa was of usual occurrence in the fatal instances of the fever, and that the prominence of the glands was no more than is met with in many blood diseases, such as in smallpox and scarlatina. The same may be said of Peyer's patches, which were more distinctly marked than they normally are, and which in four out of the five cases presented little black dots interspersed in the patch and seemingly limited to, or at least more evident in, the small glands composing the agglomeration. This appearance, which has been likened to the shaven beard, was seen, when minutely investigated, to be dependent upon a reddish-brown pigment occurring in coarse granules of much lighter colour at the circumference than at the centre, or in aggregated masses of these. The pigment is uninfluenced by acetic acid. An enlargement of the mesenteric glands, though not a very great one, was noticed in two cases.

Duration and Mortality.—The duration of the complaint is, like that of any continued fever, difficult to determine, nor is perfect accuracy attainable. But fixing the commencement of the disease from the chill, or the coming on of headache, pain in the limbs, and heat of surface, and dating the convalescence from a brightening of the mind and countenance, a decided decrease in the pulse, a diminution in the temperature of the skin, a fading eruption, returning appetite, and increasing strength, the fever does not last three weeks. Only in very severe cases, or where complications have arisen, does it pass into the third week. This was the duration in 19 uncomplicated cases which terminated favourably:—

In 2 cases	12 days	In 2 cases	17 days
" 1 case	13 "	" 1 case	18 "
" 3 cases	14 "	" 1 "	19 "
" 3 "	15 "	" 1 "	20 "
" 4 "	16 "	" 1 "	21 "

Thus in about two-thirds recovery had fully set in before the seventeenth day of the disease, and only in one did it tarry until after the twenty-first.

Recovery was not indicated by a sudden and marked change in the symptoms; the fever reached a certain point and then declined, without, as a rule, anything that could fairly be called a decided crisis taking place. Yet it must be stated that in several instances it was distinctly noticed in those patients in whom the bowels had been regular or costive, that one or two large, even loose, passages happened at what proved to be the turning point of the illness; and the changes in the urine have already been alluded to. As a rule, convalescence was rapid, and not interfered with by any untoward events. The greatest inconvenience of which patients complained was pain in the calves of the legs, and particularly in the soles of the feet, constant, yet much worse at times than at others, attended with some soreness on motion and on pressure over the muscles, and seemingly a muscular hyperæsthesia.

The *mortality* of the cases that receive attention from an early period of the malady, is, considering its nature, not very great. Out of 39 patients under my charge in the Pennsylvania Hospital 5 died (not including Case XII.). The fatal cases have all been reported in full in this paper. It will be seen that excluding Case IX. from consideration, a man who would probably have succumbed to any acute affection, the deaths were in two instances due to complications rather than to the fever, and in two more strictly to the fever itself. In one of these (Case V.) death happened on the twelfth or thirteenth day of the disease. In the other (Case VII.) on the twelfth day.

But though the proportion of deaths does not appear to be so large as it generally is in typhus, the data here given are insufficient for calculating accurately its rate of mortality. The disorder shows all grades of the fever; and in accordance with the preponderance of one or the other, the death-rate will vary. I have seen, both in and out of the hospital, a number of very light and a number of very grave cases.

Treatment.—In discussing the treatment of the affection, I shall not attempt to apply the numerical method of analysis which has been chiefly followed in this inquiry. Whatever be its merits in regard to therapeutic knowledge, and I do not propose to discuss this vexed question here, it is very evident that to prevent fallacious inferences, especially where comparative methods of treatment are tested, the conclusions must be drawn from an extended series of cases, much more extended than that forming the basis of this paper. Nor will it be necessary to discuss in full the treatment pursued in all the complications which arose, for the cases reported will for the most part indicate what that was. I shall therefore mainly present an outline of the plan followed in the majority of the cases, and which seemed to me to be most advantageous, with the exception of mentioning some points which may not be readily apparent in the narratives here given, or which have not been touched upon.

And first, of the *hygienic* treatment. This was carried out by the most

careful attention to ventilation, to cleanliness, and to diet. The fever cases were, as far as was practicable, placed in a large room by themselves, and never more than four together, and the windows, even when the weather was cold, were kept open. The patients were sponged thoroughly morning and evening with vinegar and water, and not permitted to get out of bed. The diet consisted mainly of beaf-tea, broths, and milk. The morning and evening meals were composed of as much milk and arrowroot as was relished; at dinner a bowl of chicken soup was given; and in the intervals, strong beaf-tea, or milk, generally in the form of milk-punch, was administered every two hours. In some cases they were given one shortly after the other, in others alternately every hour, and in a few instances even oftener, according to the amount of prostration attending the case, and to the patient's digestive powers. But, as a rule, he was allowed to rest for two hours at a time, and strict directions were given not to awake him at night, unless the case were very urgent, when the time for his nourishment came, but to let him sleep, if possible, three or four hours, and then to give him more than the usual quantity of food and stimulus. The average amount of beaf-tea taken at a time, was two ounces, or about one pint and a half in twenty-four hours; though some took considerably more than this. Water was very commonly craved as a drink, and was never denied.

As regards the treatment by *medicinal* means, these were mainly stimulants, the mineral acids, particularly nitro-muriatic acid, turpentine, and, during convalescence, quinia, or the vegetable bitters. Stimulants were very generally administered; yet simply to sustain the vital powers, and though in some cases upwards of twenty-four and in others at least eighteen ounces of whiskey were given in the twenty-four hours, it was with no view of giving alcohol as food, nor of following out what is known as the stimulating plan of treating fevers, but simply because that quantity seemed necessary to check the tendency to death by exhaustion. Nor was delirium looked upon as a contra-indication to the administration of the stimulus; on the contrary, when associated with a very frequent pulse (as in M. D., Bed 34), a cessation of the cerebral symptoms, and a very decided fall in the pulse followed its free use. At times the condition of the patient was such that he had to be freely stimulated even from the onset; but this treatment was ordinarily avoided. Either no whiskey, or only a few ounces were given during the earlier days of the fever, and the quantity increased as the symptoms, such as more evident weakness, or trembling, or profuse discharges, or some depressing local complication, seemed to demand that increase, but not sooner. Six to eight ounces in milk-punch (one-third of whiskey and two-thirds of milk), and in divided doses by day and by night, was the average amount employed in the twenty-four hours; and its influence chiefly on the fulness and frequency of the pulse taken as the test whether to exceed this dose; so long as the pulse did not lose in volume

and rise, it was not increased. In one case, making an excellent and speedy recovery, and in which there was delirium with a rather full pulse, not a drop of alcohol was given until the patient was far advanced in convalescence. But the character of the typhus, which is clearly of the adynamic type, renders, for the most part, free stimulation a necessity.

Nitro-muriatic acid was more commonly employed than any other medicine. It was given in from 3 to 5 drop doses of the officinal acid, diluted in water. In not one instance did it appear to interfere with the milk diet of the patients, and seemed to be rather agreeable to them. It was sometimes given conjointly, or rather alternately, with turpentine, especially in cases presenting pulmonary complications; though the more common practice, when complications occurred, or distressing symptoms had to be relieved, was to stop the acid, and meet the indications. Most of the complications, the pneumonias and parotid swelling, were treated by turpentine and quinia. In the pulmonary affections, the turpentine was used both internally and externally. Quinia was not prescribed in simple cases of the fever, excepting in a few in which it was given in small doses combined with the acid. But, as already stated, during convalescence it was generally administered, and it was sometimes then combined with iron.

Purgatives were not employed, owing to the frequent existence of diarrhœa; yet, in cases in which constipation was present, laxatives were occasionally administered, or the bowels were kept open by enemata. Bearing in mind the fact that, just as the fever declines, free passages happen, it is a matter of advantage to act on the intestinal canal about that period. The treatment of the diarrhœa requires a good deal of care. If the patient had but two or three passages daily, and was not particularly prostrate, no attempt was made to check them. But when this became desirable, laudanum enemata, or acetate of lead by enema or by the mouth, either alone or joined to opiates, was found sufficient for the purpose, except in some cases in which the looseness of the bowels resisted opiates and astringents as stubbornly as it does at times in typhoid fever. In severe cases of diarrhœa the acid treatment was stopped; so was it often when vomiting took place, a symptom which was always found to yield to the admixture of lime-water with the milk.

In cases of much delirium, or prostration and trembling, chloric ether was several times given with apparent advantage, though these cases were for the most part met by an increase of alcoholic stimulants. Restlessness and insomnia were treated with small doses of morphia, and with camphor-water, or Hoffmann's anodyne. But in severe cases chloroform proved the most efficient remedy, either alone or given with camphor. This was strikingly shown in a lad 15 years of age (E. B.), who was utterly sleepless, very restless, and delirious. On the second evening of this state of things five drops of chloroform were given in a tablespoonful of camphor-water every second hour. After the fifth dose he grew calm, and slept quietly; his

delirium, too, was favourably influenced by the continuance of the medicine, and the pulse declined from 116 to 110. The next evening he took four doses of the preparation, and passed a quiet night; but subsequent to this the morbid phenomena returned, yet again yielded to the remedy.

For the relief of the headache, cold applications to the head and sinapisms to the nape were usually employed, and they seemed ordinarily to produce the desired effect.

In bringing this paper to a conclusion, a few words on the general nature of the fever, and on some points which, bearing on the question of its prevention, are even of larger meaning than a study of its symptoms and treatment. The disorder has occurred at all seasons of the year, and, though now waning, is still encountered. During the hot months of summer comparatively few cases happened. It is seen in children as well as in adults, and is not confined to any particular locality or class of persons; and though its greatest ravages take place in the southeastern part of the city, and in localities which, from their overcrowding and filth, would be apt to propagate the fever poison, cases are met with—it is true, not many—among those living in well-ventilated houses and in every comfort. The malady is, beyond all doubt, contagious. Several instances of those nursing the sick taking the fever, and even dying in consequence, have come under my notice; while in others slight fever, headache, and gastric derangement were observed, without the supervention of actual typhus, but clearly owing to the absorption of its poison. And when once in a house, more than one case is apt to follow. It was, indeed, not uncommon for whole households to apply in succession at the hospital; but, so far as could be investigated, in not a single instance was a case of typhoid and of typhus admitted from the same house. What its origin, whether imported from across the water and taking root in this soil, or generated here, is difficult to determine. Its occurrence at the time of a vast war, and typhus being the fever which is known to decimate armies, would naturally lead to the belief that it was brought from camps to cities; but typhus fever was scarcely one of the diseases of the American army, certainly not of any portion from which soldiers would have been apt to have been sent to this city. And its prevalence over so many parts of the world, in a more than usually aggravated form, lends colour to the belief that it has been brought here, or, at least, that our typhus constitutes part of that general typhus epidemic which is so wide-spread. That it presents characters of its own, should it really be found to be dissimilar to that prevailing in other countries, may be owing to local influences; for why can we not assume that diseases may be thus altered, and, if the expression be admissible, domesticated? Whether it is to become a permanent inhabitant, or pass away, time only can solve; but wherever it has shown itself—and I believe that it has been seen in many of our cities—the most stringent hygienic regulations ought to be enforced.